OGGETTI SOTTOPOSTI A VERIFICHE / *ITEMS UNDER TESTS*	
Descrizione *Description*	Display used for information system
Modello base *Basic Model type*	Compact TFT 32" Outdoor Code 993201900100
Modelli derivati *Derived Models type*	D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z0 D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z1
Identificativo interno *Storage No.*	190883 (sampled by customer)
Richiedente *Applicant*	Aesys S.p.A.
Indirizzo *Address*	Via Pastrengo, 7/C I-24068 Seriate (BG) - Italia
Prove effettuate presso *Test carried out by*	TÜV Rheinland Italia Srl Via E. Mattei, 3 – 20010 Pogliano Milanese (Italy)
Norme di riferimento *Reference Standards*	**Partial tests in according to ETSI EN 301 908-2 V.11.1.2 (§4.2.4)**
Scopo delle prove *Scope of the tests*	To verify the compliance with the following clauses of reference standards • See summary of testing TEST SUMMARY section
Risultati di prova *Test Results*	**COMPLIANT**

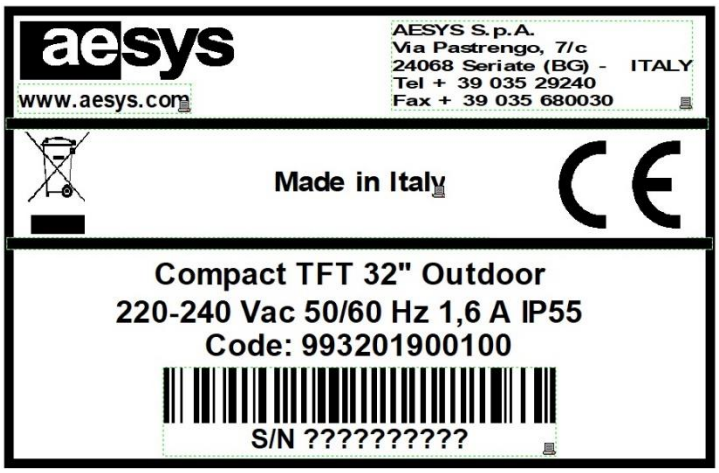
Data ricevimento campioni *Date of samples receiving*	21/08/2019		
Data inizio prove *Date of tests start*	27/08/2019	**Data fine prove** Date of tests end	27/08/2019
Rapporto composto da *Test report composed by*	28 Pages		

Provato da / Tested by *(name + signature)*	**Approvato da / Approved by** *(name + signature)*
Andrea Bortolotti *(Laboratory Technician)*	Roberto Radice *(Reviewer)*

The results referred in this report are only relevant to the samples tested and described in this report.
Only complete reproduction of this test report is permitted without written authorisation of TÜV Rheinland Italia
Compliance with test requirements recorded in this technical report does not give presumption of compliance to all requirements by reference standard

RELEASE CONTROL RECORD		
TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
28118771 005	Original release	20/10/2020

OGGETTO SOTTOPOSTO A PROVE / *ITEM UNDER TEST*

Descrizione *Description*	Display used for information system
Marca *Brand*	aesys
Costruttore *Manufacturer*	Aesys S.p.A.
Modello base *Basic Model / Type reference*	Compact TFT 32" Outdoor Code 993201900100
Dati di targa *Ratings*	
Classificazione *EUT classification*	---
Massima frequenza di clock *Maximum clock frequency*	---
Installazione *Standing*	Wall / Ceiling / Embedded / Pole support

PRODUCT DESCRIPTION

This display can be part, with any other panels similar or of different types, of a system aimed at informing users in transit on rail vehicles of information to travelers on the railway lines, or general information.

Mechanical	
Size:	TFT 32"
Dimensions:	836 (L) x 530 (H) x 160 (D) mm
Estimated Weight	45Kg

Finish Front :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Finish Rear :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Protection grade:	IP55		
Front protection:	Antireflective (both side) Laminated Tempered glass with UV and IR protection (compliance to IK08 5J according to the EN62262)		
Lock system:	Hinged door, polyurethane bi-component vulcanized gasket; Special anti-vandal locks		
Interfaces:	1x Power Supply 1x RJ45 Data Line 1x M6 Additional ground interface 3x SMA connector (for Wireless 2G/3G/4G version, RF antenna & WLfi) 1x Audio Output (for further details see the attached mechanical drawing)		
Fixing points:	Monitor : Vesa standard 200x200mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)
Other:	Mechanical housing compliant to IK10 20J according to the EN62262		

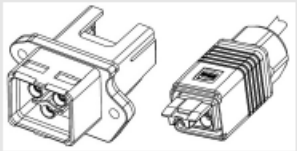
Electrical	
Size	TFT 32"
Input power supply voltage:	Nominal 220-240V AC
	Range: 198V AC ÷ 264V AC
Input power supply frequency range:	50/60Hz
Protections:	Overload, overvoltage, over temperature
Power Consumption:	Typ.: 130W (@Brightness 70%)
	Max.: 165W (@ Brightness 100%)
	Max.: 325W (@ Brightness 100%, Heating ON)

Environmental	
Operating temperature:	-25° ÷ 50° C when installed with Suncover / Sunshade
Thermal management:	At high temperature: - Automatic TFT-LCD matrix brightness linear derating down to maximum 50% with the increase of the environmental temperature - TFT-LCD matrix and PC switched OFF when the highest temperature limit is reached
	At low temperature: - display is switched off when the lowest temperature limit is reached
Operating humidity:	10 % ÷ 95 % R.H. without condensation
Storage temperature:	-20° ÷ 60° Celsius – Ambient temperature 10% ÷ 95% - R.H. at this conditions: - till +40°C @90% R.H. - till +50°C @60% R.H. - till +60°C @40% R.H.
Cooling system:	Direct air exchange with the outside by special filter
Heating system:	Installed
Temperature Sensor	Installed
Light Sensor	Installed
Acceleration Sensor	*Upon request*

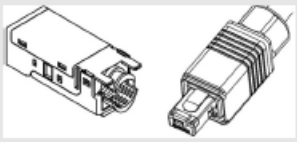
Data Communication	
Type of communication:	Copper LAN Ethernet 10/100/1000 Base TX
Protocol type:	Different protocol types supported (according to the software player hosted), SNMP protocol for diagnostic data
Other:	*Upon request:* *- Built-in LAN Ethernet 10/100/1000Base TX to 10/100/1000Base FX Media converter (multimode)* *- Wireless 2G/3G/4G* *- Wi-fi* *(for further details refer to the commercial offer)*
Connectors	
Power supply:	1x Harting PushPull Power 2/0, panel feed-through and connector, 3-poles (2+PE)
Data line:	1x Harting PushPull RJ45 Technology, RJ45-panel jack feed-through
Audio output:	1x Cable Gland
Antenna:	3x SMA Connector
Ground interface:	1x M6 male ground point

Optical specifications (matrix module)	
Size:	TFT 32"
Format:	16:9
Type:	Normally black
(*) Active area:	698.4 (H) x 392.85 (V) mm
(*) Pixel pitch:	0.36375 x 0.36375 mm x RGB
Pixel format:	1920 (H) x 1080 (V) (Native resolution)
Colour depth:	16.7M colors
Luminance:(on white colour)	1.000 cd/m^2 (typ.) @ Center point
Contrast ratio:	4000 : 1 typ. (with dimming)
Viewing angle (CR > 10):	R/L 178° (typ.) – U/D 178° (typ.)
Response time:	8ms (Typ., Grey-to-Grey)
Backlight Technology:	LED

Power Supply

Connector Type	Pin #	Signal	Description
 Harting Push pull V4 Power plug	1	L	Line 230Vac power input
	2	N	Neutral 230Vac power input
	3	GND	Ground

Ethernet data line

Connector Type	Pin #	Signal	Description
 Harting Push pull V4 RJ45	1	TX+	Transmit Data +
	2	TX-	Transmit Data -
	3	RX+	Receive Data +
	4	BI_DC+ (GHz)	DC+ for GBe
	5	BI_DC- (GHz)	DC- for GBe
	6	RX-	Receive Data -
	7	BI_DD+ (GHz)	DD+ for GBe
	8	BI_DD- (GHz)	DD- for GBe

RADIO MODULE - - TECHNICAL DATA DECLARED BY THE MANUFACTURER

Simcom SIM7100E

General features	**Specifications for Data transfer**
Five-Band FDD-LTE B1/B3/B7/B8/B20 Dual-Band TDD-LTE B38/B40 Dual-Band UMTS/HSDPA/HSPA+ B1/B8 Dual-Band GSM/GPRS/EDGE 900/1800 MHz Control Via AT Commands Supply voltage range: 3.4V~ 4.2V Operation temperature: -40℃ to +85℃ Dimension: 30 X 30X 2.9 mm Weight: 5.8g GNSS: gpsOne Gen 8B;standalone;assisted,XTRA;	LTE •Uplink up to 50Mbps •Downlink up to 100Mbps HSPA+ •Uplink up to 5.76 Mbps •Downlink up to 42 Mbps UMTS •Uplink/Downlink up to 384Kbps EDGE Class: •Max. 236.8Kbps(DL),Max. 236.8Kbps(UL) GPRS •Max. 85.6Kbps(DL), Max. 85.6Kbps(UL) CSD •GSM data rate 14.4Kbps •WCDMA data rate 57.6Kbps •WCDMA 64kbps CSD for Video call
Other features	**Interfaces**
USB Driver for Microsoft Windows2000/XP/Vista/7/8 USB Driver for Windows CE/Mobile USB Driver for Linux /Android RIL supporting for Android/Windows CE/Mobile Automatic installation for windows Linux API SDK Firmware update via USB TCP/IP/IPV4/V6 Multi-PDP,MT PDP FTP/FTPS/HTTP/HTTPS/SMTP/POP3/DNS/MMS DTMF Gobi SDK to the Win7/Win8/Linux MBIM to Win8 Source code of the PC manager of the device for reference	USB2.0 UART SIM card SPI I2C Keypad(5*5) Constant current sink GPIO ADC PCM SDIO

COMPONENTI AUSILIARI / *ANCILLARY EQUIPMENTS*		
Description	**Manufacturer**	**Model name**
RADIO TEST SET	R&S	CMW500

COMPONENTI AUSILIARI / *AUXILIARY COMPONENTS*		
Description	**Manufacturer**	**Model**
---	---	---

INTERFACE PORTS				
Port	**Description**	**Connection**	**Shielded**	**Cable length**
Enclosure	Conductive surface	Closed by screws	---	---
AC Power Port	Main Input	Input 230V 50/60Hz (Phase/Neutral with protective earth)	No	---
DC Power Port	Port not present			
Analogue/digital data ports	---	Port not present	No	<3m.
Wired Network port	Ethernet data line	RJ45 connector	Yes	>3mt
*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports				

MODALITA' DI FUNZIONAMENTO / *OPERATING MODES*	
#1	*EUT in TX Calling.*
#2	*EUT in RX Idle mode.*

Reference Document	Title of Document
ETSI EN 301 908-2 V.11.1.2	IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE)

TRANSMITTER SPURIOUS EMISSIONS

Definition
Spurious emissions are emissions, which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

Test Environment
Normal

Test requirements
The results obtained shall be compared to the limits in tables 4.2.4.2-1 and 4.2.4.2-2 in order to show compliance.

Table 4.2.4.1.2-1: General spurious emissions requirements

Frequency bandwidth	Measurement bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	-36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	-36 dBm
30 MHz ≤ f < 1 000 MHz	100 kHz	-36 dBm
1 GHz ≤ f < 12,75 GHz	1 MHz	-30 dBm
12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	1 MHz	–30 dBm (note)
NOTE: Applies only for Band XXII.		

Table 4.2.4.1.2-2: Additional spurious emissions requirements

Operating band	Frequency bandwidth	Measurement bandwidth	Minimum requirement
I	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz	-67 dBm (note 1)
	935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
III	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz	-67 dBm (note 1)
	935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	3,84 MHz	-60 dBm
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
VII	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz	-67 dBm (note 1)
	935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 620 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
	2 590 MHz ≤ f ≤ 2 620 MHz	3,84 MHz	-50 dBm
VIII	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	925 MHz ≤ f ≤ 935 MHz	100 kHz 3,84 MHz	-67 dBm (note 1) -60 dBm
	935 MHz < f ≤ 960 MHz	100 kHz 3,84 MHz	-79 dBm (note 1) -60 dBm
	1 805 MHz < f ≤ 1 830 MHz	100 kHz 3,84 MHz	-71 dBm (notes 1 and 2) -60 dBm (note 2)
	1 830 MHz < f ≤ 1 880 MHz	100 kHz 3,84 MHz	-71 dBm (note 1) -60 dBm
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 640 MHz	3,84 MHz	-60 dBm
	2 640 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm (note 2)
XV	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f ≤ 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz 3,84 MHz	-67 dBm (note 1) -60 dBm
	935 MHz ≤ f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 620 MHz	3,84 MHz	-50 dBm
	2 620 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm

Operating band	Frequency bandwidth	Measurement bandwidth	Minimum requirement
XVI	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f ≤ 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz 3,84 MHz	-67 dBm (note 1) -60 dBm
	935 MHz ≤ f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 620 MHz	3,84 MHz	-50 dBm
	2 620 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
XX	470 MHz ≤ f ≤ 790 MHz	8 MHz	-65 dBm (note 3)
	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f ≤ 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz 3,84 MHz	-67 dBm (note 1) -60 dBm
	935 MHz ≤ f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 620 MHz	3,84 MHz	-50 dBm
	2 620 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
XXII	791 MHz ≤ f ≤ 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (note 1)
	925 MHz ≤ f ≤ 935 MHz	100 kHz 3,84 MHz	-67 dBm (note 1) -60 dBm
	935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm (note 1)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (note 1)
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 620 MHz	3,84 MHz	-50 dBm
	2 620 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
	3 510 MHz ≤ f ≤ 3 525 MHz	1 MHz	-40 dBm
	3 525 MHz ≤ f ≤ 3 590 MHz	1 MHz	-50 dBm
	3 600 MHz ≤ f ≤ 3 800 MHz	3,84 MHz	-50 dBm

RECEIVER SPURIOUS EMISSIONS

Definition
The spurious emissions power is the power of emissions, generated or amplified in a receiver, which appear at the UE antenna connector. The requirements in UE transmit bands are valid in URA_PCH, Cell_PCH and idle state.

Test Environment
Normal

Test requirements
The power of any narrow band CW spurious emission shall not exceed the maximum level specified in tables 4.2.10.2-1 and 4.2.10.2-2

Table 4.2.10.2-1: General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level
30 MHz ≤ f < 1 GHz	100 kHz	-57 dBm
1 GHz ≤ f ≤ 12,75 GHz	1 MHz	-47 dBm

Table 4.2.10.2-2: Additional receiver spurious emission requirements

Band	Frequency Range	Measurement Bandwidth	Maximum level
I	1 920 MHz ≤ f ≤ 1 980 MHz	3,84 MHz	-60 dBm
III	1 710 MHz ≤ f ≤ 1 785 MHz	3,84 MHz	-60 dBm
VII	2 500 MHz ≤ f ≤ 2 570 MHz	3,84 MHz	-60 dBm
VIII	880 MHz ≤ f ≤ 915 MHz	3,84 MHz	-60 dBm
XV	791 MHz ≤ f < 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (see note)
	925 MHz ≤ f < 935 MHz	100 kHz 3,84 MHz	-67 dBm (see note) -60 dBm
	935 MHz ≤ f ≤ 960 MHz	100 kHz	-79 dBm (see note)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (see note)
	1 900 MHz ≤ f ≤ 1 920 MHz	3,84 MHz	-60 dBm
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm

Band	Frequency Range	Measurement Bandwidth	Maximum level
XVI	791 MHz ≤ f < 821 MHz	3,84 MHz	-60 dBm
	921 MHz ≤ f < 925 MHz	100 kHz	-60 dBm (see note)
	925 MHz ≤ f < 935 MHz	100 kHz 3,84 MHz	-67 dBm (see note) -60 dBm
	935 MHz ≤ f ≤ 960 MHz	100 kHz	-79 dBm (see note)
	1 805 MHz ≤ f ≤ 1 880 MHz	100 kHz	-71 dBm (see note)
	2 010 MHz ≤ f ≤ 2 025 MHz	3,84 MHz	-60 dBm
	2 110 MHz ≤ f ≤ 2 170 MHz	3,84 MHz	-60 dBm
	2 585 MHz ≤ f ≤ 2 690 MHz	3,84 MHz	-60 dBm
XX	832 MHz ≤ f ≤ 862 MHz	3,84 MHz	-60 dBm
XXII	3 410 MHz ≤ f ≤ 3 490 MHz	3,84 MHz	-60 dBm
NOTE:	The receiver additional spurious emission measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in table 4.2.10.2-1 are permitted for each UARFCN used in the measurement. This note applies also to receiver additional spurious emission measurements according to table 4.2.12.1.2-1.		

SOMMARIO DELLE PROVE / *TESTS SUMMARY*

RADIATED SPURIOUS EMISSIONS – TX "BAND I" **17**

RADIATED SPURIOUS EMISSIONS – RX "BAND I" **20**

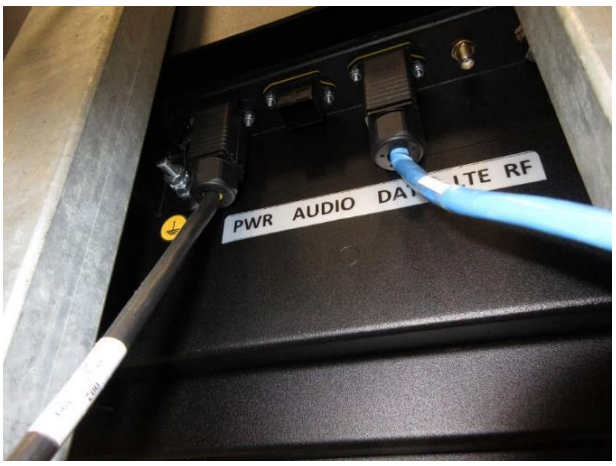
RADIATED SPURIOUS EMISSIONS – TX "BAND VIII" **23**

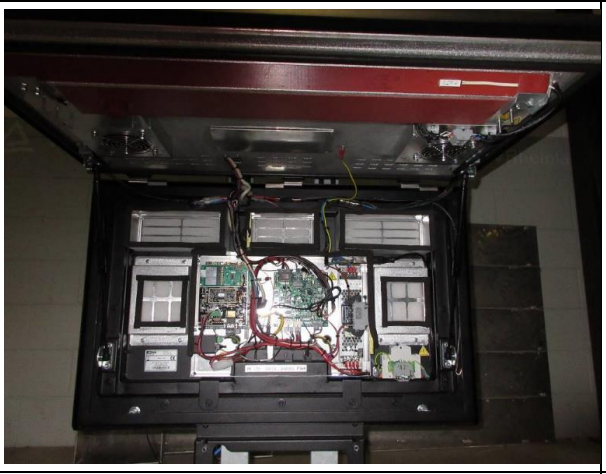
RADIATED SPURIOUS EMISSIONS – RX "BAND VIII" **26**

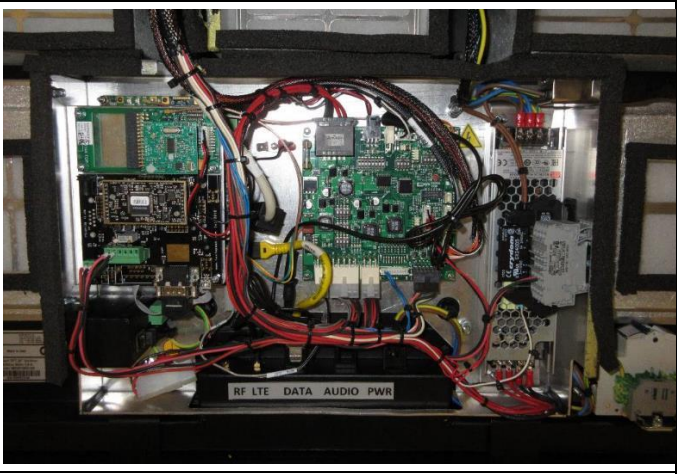
SOMMARIO DELLE PROVE / *TESTS SUMMARY*			
No.	**Description**	**Mode**	**Results**
1	Radiated spurious emissions	TX "BAND I"	COMPLIANT
2	Radiated spurious emissions	RX "BAND I"	COMPLIANT
3	Radiated spurious emissions	TX "BAND VIII"	COMPLIANT
4	Radiated spurious emissions	RX "BAND VIII"	COMPLIANT

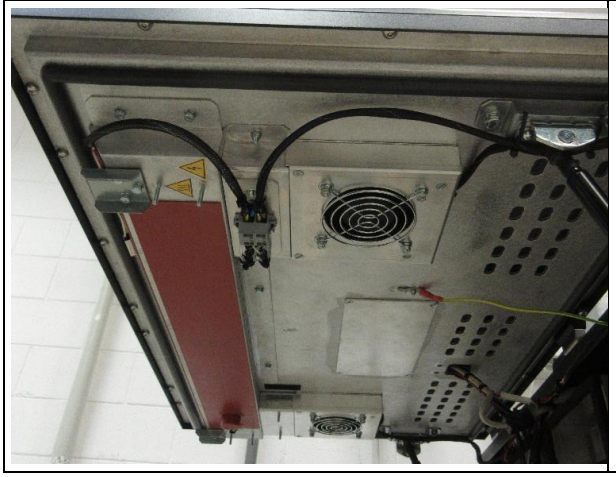
Legend:
Compliant = Result within the limits
N/A = Not Applicable
N/R = Not requested by the Client

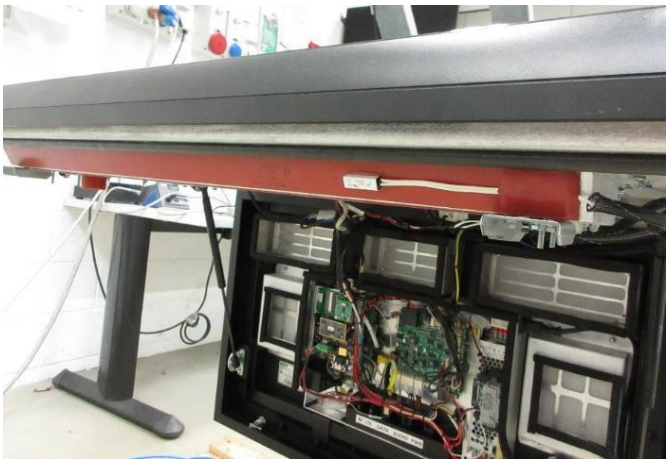
PHOTOGRAPHIC DOCUMENTATION

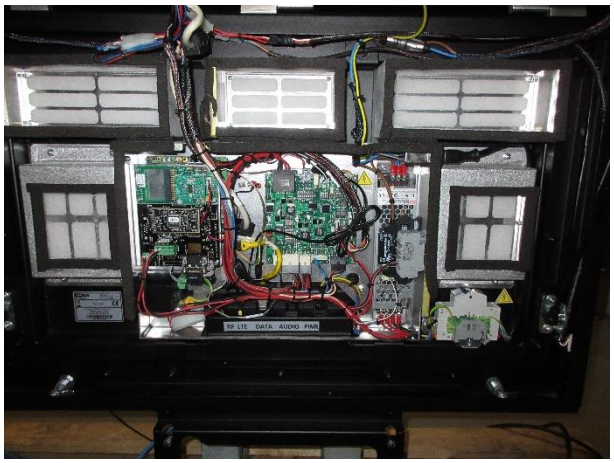

PWR AUDIO

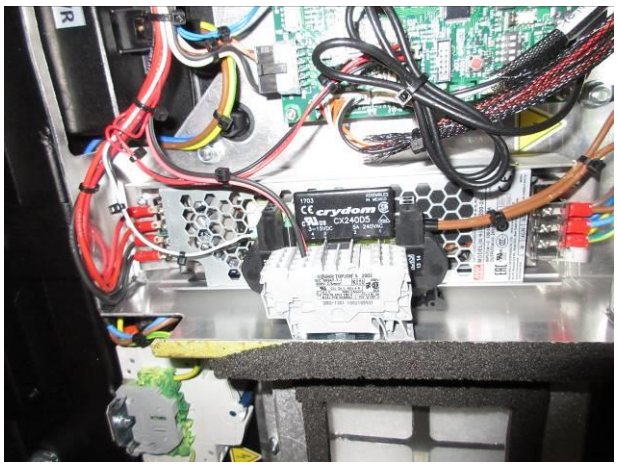


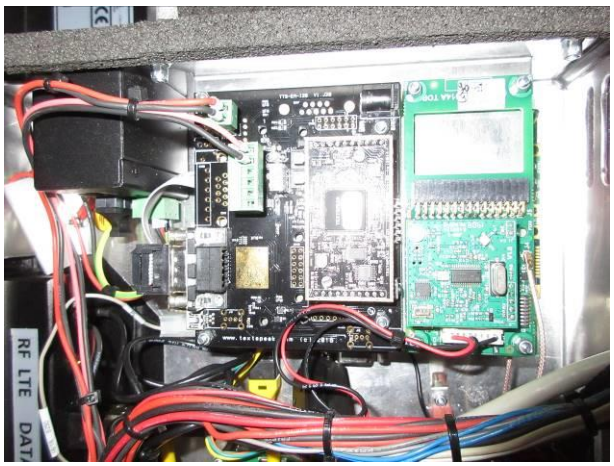

RF LTE DATA AUDIO PWR



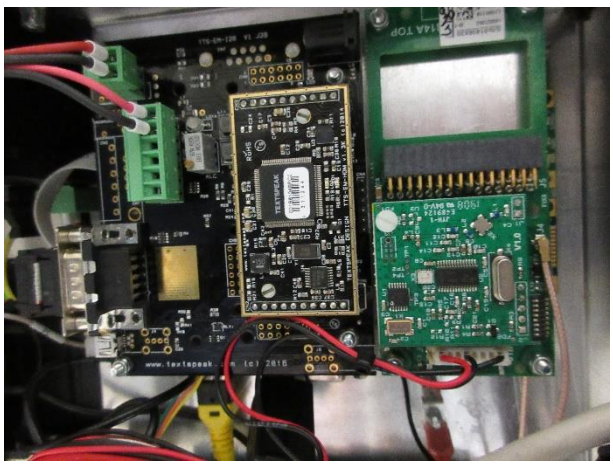





crydom
CX240D5


RF LTE DAT

UI2 UCHIYA 3
110C 164



Test N.1	**RADIATED SPURIOUS EMISSIONS – TX "BAND I"**

Reference Standard	ETSI EN 301 908-2 V.11.1.2
List of reference equipment	➢ Semianechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 8020484) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 87020458) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142E (Inv. 87020457) ➢ High pass filter Wainwrigth Inst. Mod. WHKX10-2070-2300-180 (Inv. 2782703)

Measurement Uncertainty	**Frequency:**	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
	9kHz-1GHz	2,7 dB	95%	2,3
	1-8GHz	3,3 dB	95%	2,3
	8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – External Antenna)

5.3.3.1.1 Initial conditions

Test environment: normal (see annex B).
The frequencies to be tested are low range, mid range and high range as defined in TS 134 108 [3]:
1) Connect the SS to the UE antenna connector.
2) A call is set up according to the Generic call setup procedure.
3) Enter the UE into loopback test mode and start the loopback test using the procedure defined in TS 134 109 [4].
NOTE: When reference is made to test set up, call set up and loopback test mode, guidance on the applicability of these can be found in TS 134 121-1 [2], TS 134 108 [3] and TS 134 109 [4] respectively.

5.3.3.1.1A Initial conditions for DC-HSUPA

Test environment: normal (see annex B).
The frequencies to be tested are low range, mid range and high range as defined in TS 134 108 [3]:
1) Connect the SS (node B emulator) to the UE antenna connector.
2) Set up the UL Reference Measurement Channel and parameters, and the DL Reference Measurement Channel.
3) An E-DCH call is set up with relevant exceptions in the RADIO BEARER SETUP message in order to allow the beta values to be set and each UL physical channel to be at constant power during the measurement. RF
parameters are set up and settings for the serving cell are defined.
4) Enter the UE into loopback test mode and start the loopback test using the procedure defined in TS 134 109 [4].
Details of initial conditions for UEs supporting DC-HSUPA can be found in TS 134 121-1 [2], clause 5.11A.

5.3.3.1.2 Procedure

1) Set and send continuously Up power control commands to the UE until the UE output power shall be maximum level.
2) Sweep the spectrum analyser (or equivalent equipment) over a frequency range and measure the average power of spurious emission.

5.3.3.1.2A Procedure for DC-HSUPA

1) Set the UE to maximum output power according to 5.3.1.1.2A steps 1 to 4.
2) Sweep the spectrum analyzer (or equivalent equipment) over a frequency range and measure the average power of spurious emission.
Details of test method for UEs supporting DC-HSUPA can be found in TS 134 121-1 [2], clause 5.11A.

Limits

Table 4.2.4.1.2-1: General spurious emissions requirements

Frequency bandwidth	Measurement bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	-36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	-36 dBm
30 MHz ≤ f < 1 000 MHz	100 kHz	-36 dBm
1 GHz ≤ f < 12,75 GHz	1 MHz	-30 dBm
12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	1 MHz	–30 dBm (note)
NOTE: Applies only for Band XXII.		

Normal test conditions (in acc.to Annex B of EN 301 908-2 V11.1.2)						
BAND I	**Transmitter spurious emission**					
Channel:	**Medium**		**Test temperature: 24°C**		**Voltage: 230Vac**	
Frequency range (MHz)	**Filter bandwidth (KHz)**				**Limit (dBm)**	
0,009-0,150	1				-36	
0,150-30	10				-36	
30-791	100				-36	
791-821	3840				-60	
821-921	100				-36	
921-925	100				-60	
925-935	100				-67	
935-960	100				-79	
960-1000	100				-36	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---
Frequency range (MHz)	**Filter bandwidth (KHz)**				**Limit (dBm)**	
1000-1805	1000				-30	
1805-1880	100				-71	
1880-2110	1000				-30	
2110-2170	3840				-60	
2170-2585	1000				-30	
2585-2690	3840				-60	
2690-12750	1000				-30	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.2	**RADIATED SPURIOUS EMISSIONS – RX "BAND I"**

Reference Standard	ETSI EN 301 908-2 V.11.1.2
List of reference equipment	➢ Semianechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 8020484) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 87020458) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 87020457)

Measurement Uncertainty	**Frequency:**	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
	9kHz-1GHz	2,7 dB	95%	2,3
	1-8GHz	3,3 dB	95%	2,3
	8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – External Antenna)

5.3.9.1 Method of test

5.3.9.1.1 Initial conditions

Test environment: normal (see annex B).
The frequencies to be tested are mid range as defined in TS 134 108 [3]:
1) Connect a spectrum analyser (or other suitable test equipment) to the UE antenna connector.
2) UE shall be in CELL_FACH state.
3) The UE shall be setup such that UE will not transmit during the measurement. (For guidance see TS 134 121-1 [2]).

5.3.9.1.2 Procedure

Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the average power of the spurious emissions.

Limits

Table 4.2.10.2-1: General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level
30 MHz ≤ f < 1 GHz	100 kHz	-57 dBm
1 GHz ≤ f ≤ 12,75 GHz	1 MHz	-47 dBm

Normal test conditions (in acc.to Annex B of EN 301 908-2 V11.1.2)						
BAND I	**Receiver spurious emission**					
Channel:	**Medium (in acc. To ETSI TS 134 108 [2], clause 5.1)**		**Test temperature: 24°C**		**Voltage: 230Vac**	
Frequency range (MHz)		**Filter bandwidth (KHz)**			**Limit (dBm)**	
30-1000		100			-57	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---
Frequency range (MHz)		**Filter bandwidth (KHz)**			**Limit (dBm)**	
1000-1920		1000			-30	
1920-1980		3840			-60	
1980-12750		1000			-30	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.3	**RADIATED SPURIOUS EMISSIONS – TX "BAND VIII"**

Reference Standard	ETSI EN 301 908-2 V.11.1.2
List of reference equipment	➢ Semianechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 8020484) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 87020458) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 87020457) ➢ High pass filter Wainwrigth Inst. Mod WHKX10-1170-1300-150 (Inv. 2782705)

Measurement Uncertainty	**Frequency:**	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
	9kHz-1GHz	2,7 dB	95%	2,3
	1-8GHz	3,3 dB	95%	2,3
	8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – External Antenna)

a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber precalibration may be used instead of a substitution measurement.

c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table 12.8. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.

NOTE 1: This ensures that both the active times (MS transmitting) and the quiet times are measured.

NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

Limits

Frequency range	Power level in dBm
	GSM 400, GSM 900, DCS 1 800
30 MHz to 880 MHz	-57
880 MHz to 915 MHz	-59
915 MHz to 1000 MHz	-57
1 GHz to 1 710 MHz	-47
1 710 MHz to 1 785 MHz	-53
1 785 MHz to 4 GHz	-47

Normal test conditions (in acc.to Annex B of EN 301 908-2 V11.1.2)						
BAND VIII	**Transmitter spurious emission**					
Channel:	**Medium**		**Test temperature: 24°C**		**Voltage: 230Vac**	
Frequency range (MHz)	**Filter bandwidth (KHz)**				**Limit (dBm)**	
0,009-0,150	1				-36	
0,150-30	10				-36	
30-791	100				-36	
791-821	3840				-60	
821-925	100				-36	
925-935	100				-67	
	3840				-60	
935-960	100				-79	
	3840				-60	
960-1000	100				-36	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---
Frequency range (MHz)	**Filter bandwidth (KHz)**				**Limit (dBm)**	
1000-1805	1000				-30	
1805-1830	100				-71	
	3840				-60	
1830-1880	100				-71	
	3840				-60	
1880-2110	1000				-30	
2110-2170	3840				-60	
2170-2585	1000				-30	
2585-2640	3840				-60	
2640-2690	3840				-60	
2690-12750	1000				-30	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

Test N.4	**RADIATED SPURIOUS EMISSIONS – RX "BAND VIII"**

Reference Standard	ETSI EN 301 908-2 V.11.1.2
List of reference equipment	➢ Semianechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 8020484) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 87020458) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 87020457)

Measurement Uncertainty	**Frequency:**	**Expanded uncertainty:**	**Coverage probability:**	**Coverage factor:**
	9kHz-1GHz	2,7 dB	95%	2,3
	1-8GHz	3,3 dB	95%	2,3
	8-40GHz	3,5 dB	95%	2,3

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Procedure (Radiated – External Antenna)

5.3.9.1 Method of test

5.3.9.1.1 Initial conditions

Test environment: normal (see annex B).
The frequencies to be tested are mid range as defined in TS 134 108 [3]:
1) Connect a spectrum analyser (or other suitable test equipment) to the UE antenna connector.
2) UE shall be in CELL_FACH state.
3) The UE shall be setup such that UE will not transmit during the measurement. (For guidance see TS 134 121-1 [2]).

5.3.9.1.2 Procedure

Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the average power of the spurious emissions.

Limits

Table 4.2.10.2-1: General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level
30 MHz ≤ f < 1 GHz	100 kHz	-57 dBm
1 GHz ≤ f ≤ 12,75 GHz	1 MHz	-47 dBm

Normal test conditions (in acc.to Annex B of EN 301 908-2 V11.1.2)						
BAND VIII	**Receiver spurious emission**					
Channel:	**Medium (in acc. To ETSI TS 134 108 [2], clause 5.1)**		**Test temperature: 24°C**		**Voltage: 230Vac**	
Frequency range (MHz)		**Filter bandwidth (KHz)**			**Limit (dBm)**	
30-880		100			-57	
880-915		3840			-60	
915-1000		100			-57	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---
Frequency range (MHz)		**Filter bandwidth (KHz)**			**Limit (dBm)**	
1000-12750		1000			-47	
Frequency (MHz)	**MaxPeak (dBm)**	**Height (cm)**	**Azimuth (deg)**	**Polarization**	**Limit (dBm)**	**Margin (dB)**
---	See note 1	---	---	---	---	---

Note 1: No spurious are detected over CSA noise level (margin between limits/noise level >6dB)

END OF TEST REPORT